

Young Researchers Seminar 2009

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Time use constraints in multimodal trips making

Madrid case study

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Table of contents

- 1) Introduction
- 2) Methodology
- 3) Case study: Madrid metropolitan area
- 4) Results
- 5) Conclusions

1) Introduction (I)

- People dedicate a limited time to their daily trips, so multimodal trips are penalized because they are usually longer (in time) than unimodal trips
- Public transport chains have a problem to keep their competitive performance level against car



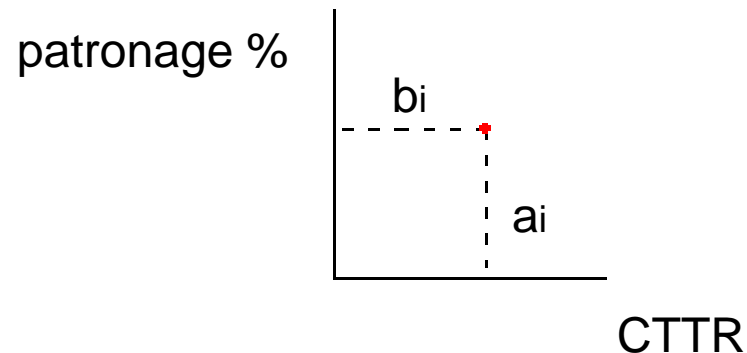
1) Introduction (& II)



- It is necessary to assess if a specific public transport option could be a real alternative to car mobility
- Data available from mobility surveys can be used to define a “comparative travel time ratio” (CTTR) between public transport travel time and car travel time

2) Methodology

- In each Origin / Destination pair:
 - PT mode_i trips → Travel time = t_{pi}
→ Patronage = a_i (PT mode_i trips/total trips_{o/d})
 - Car trips → Travel time = t_c
 - $CTTR_i = t_{pi} / t_c = b_i$



3) Study case: Madrid metropolitan area and its zones



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3) Social indicators. Madrid metropolitan area, 2004

		Inhabitants	Surface area km ²	Density inh/km ²	Jobs	Jobs/1,000 inh
Madrid municipality	CBD	1,018,732	42	24,256	959,877	942
	Periphery	2,116,513	564	3,753	815,648	385
Metropolitan ring		2,328,494	2,086	1,116	893,982	384

3) Public transport modes in Madrid metropolitan area

- **Urban bus:** are operated by the municipal transport company (EMT) in Madrid municipality 
- **Metro:** Metro service in Madrid Metropolitan area. Only 2 of the 12 lines of the network are in the metropolitan ring 
- **Suburban bus:** are operated by many private and public companies in the metropolitan ring 
- **Suburban train:** railways services operated by RENFE 




3) Study case: Madrid metropolitan area Household survey

ENCUESTA DOMICILIARIA DE MOVILIDAD DE 2004 EN LA COMUNIDAD DE MADRID

CONSORCIO
TRANSPORTES
DE MADRID

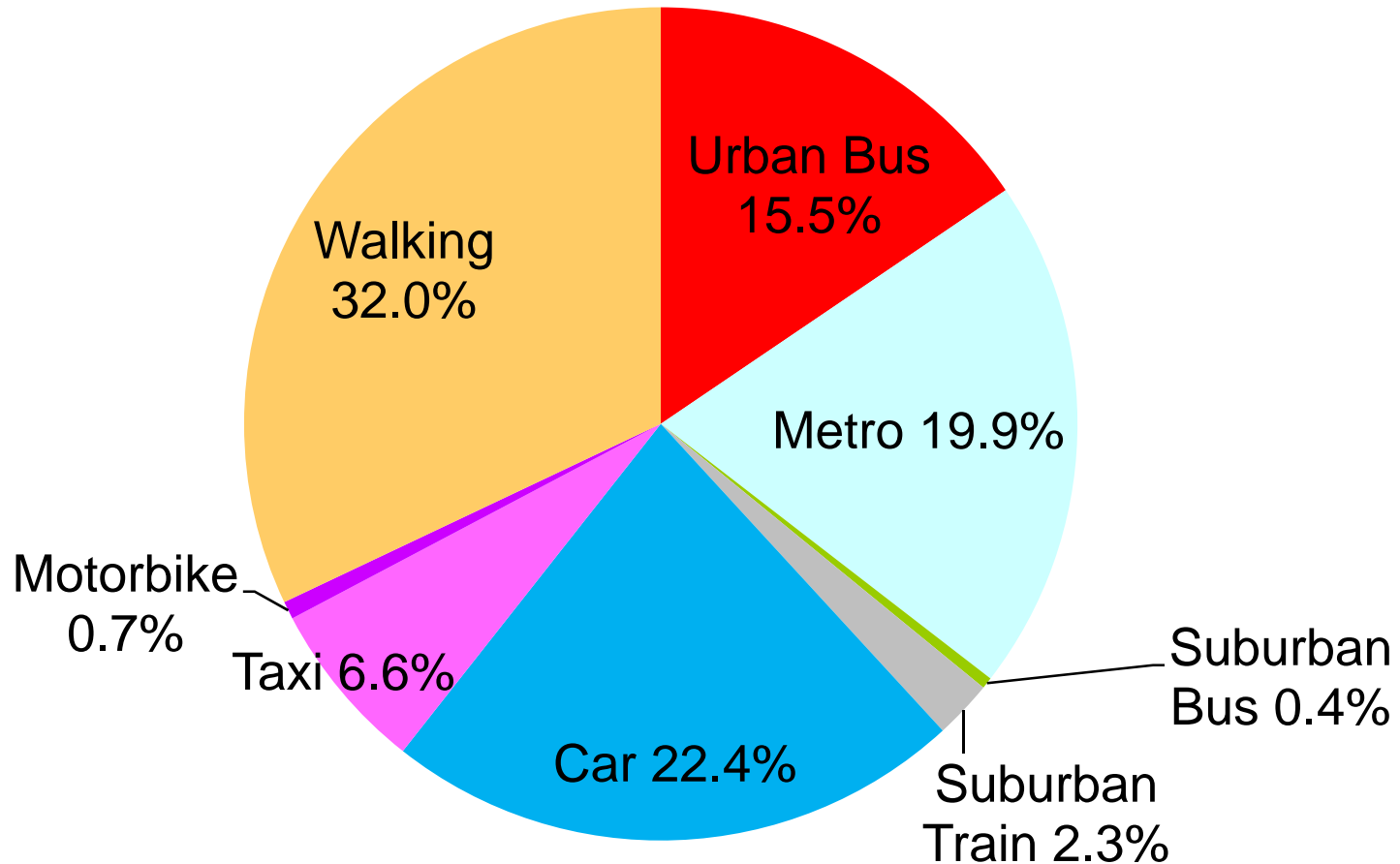
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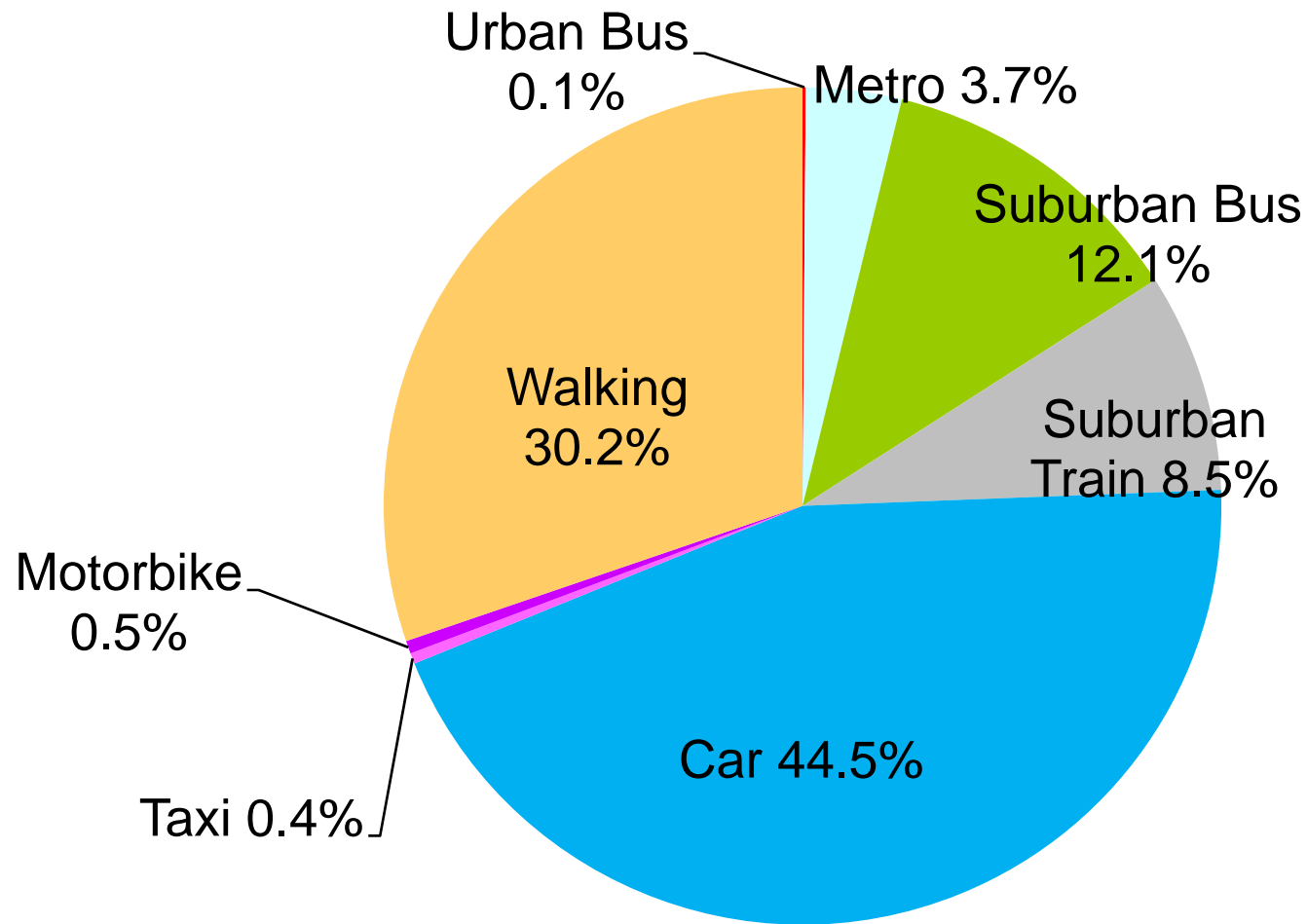
34,942 households 
84,317 persons
Asked about trips in a working day:
Number of trips, modes used, trip origin, trip destination...



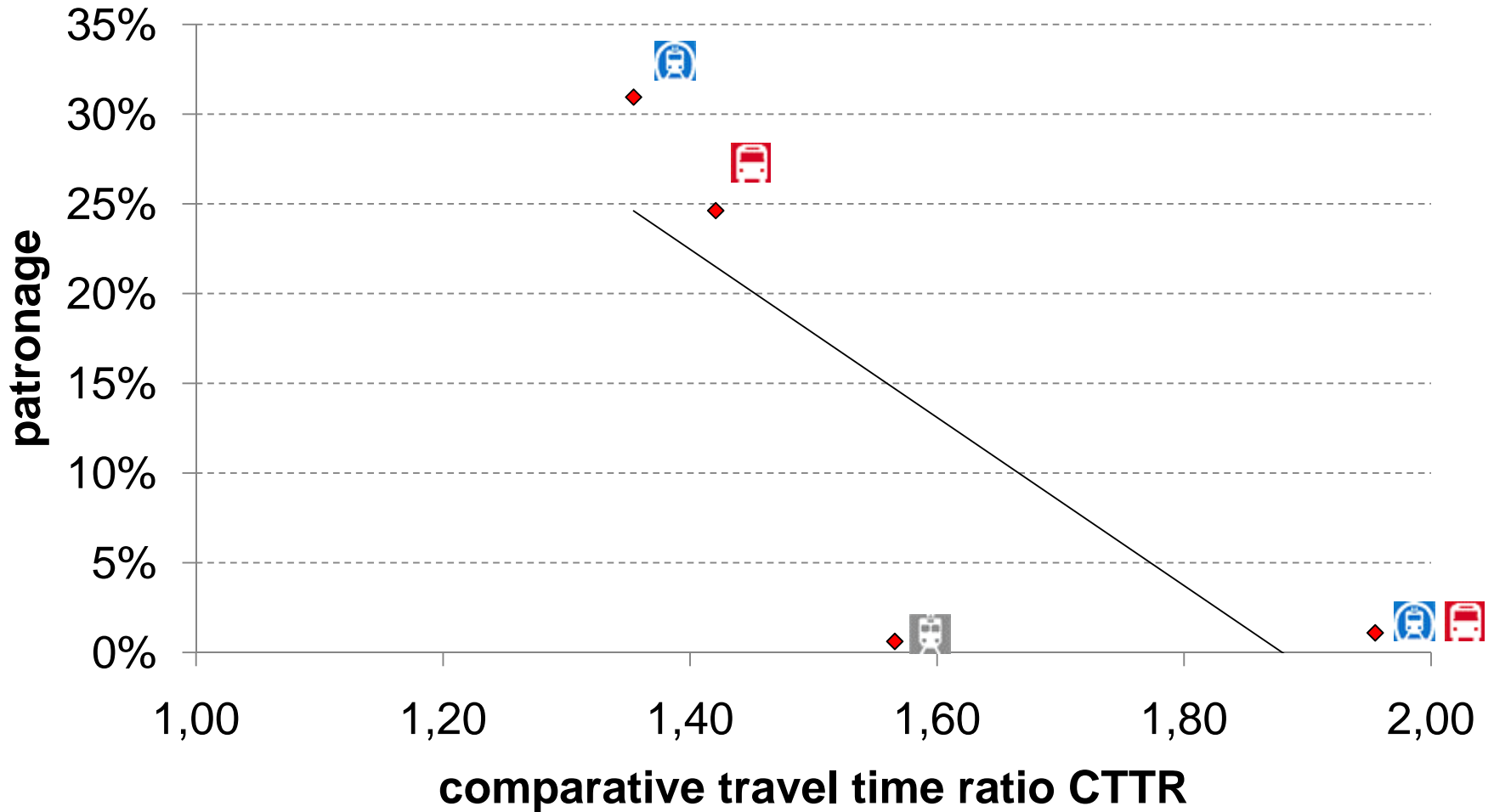
3) Modal split. Urban trips, 2004



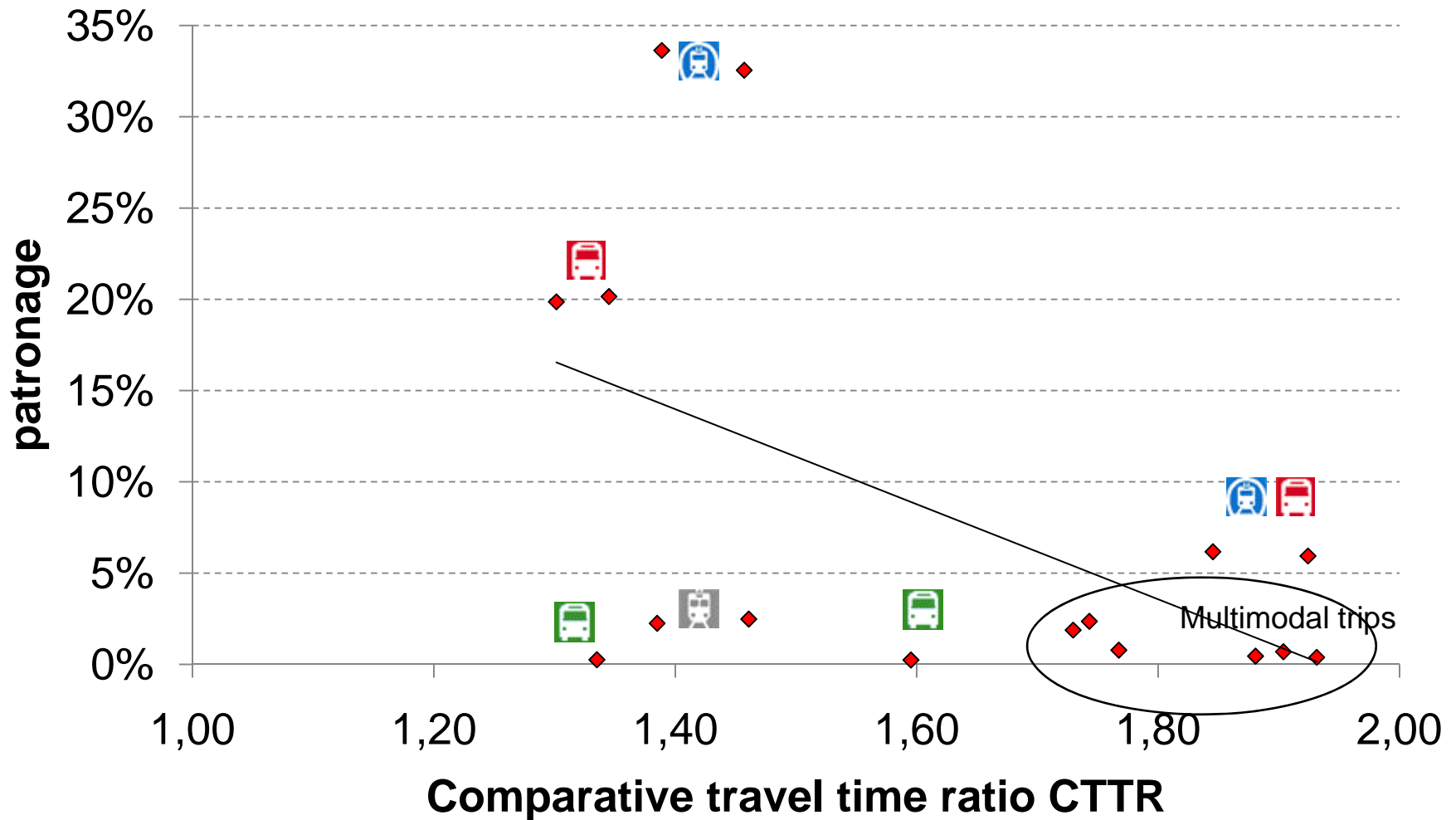
3) Modal split. Metropolitan trips, 2004



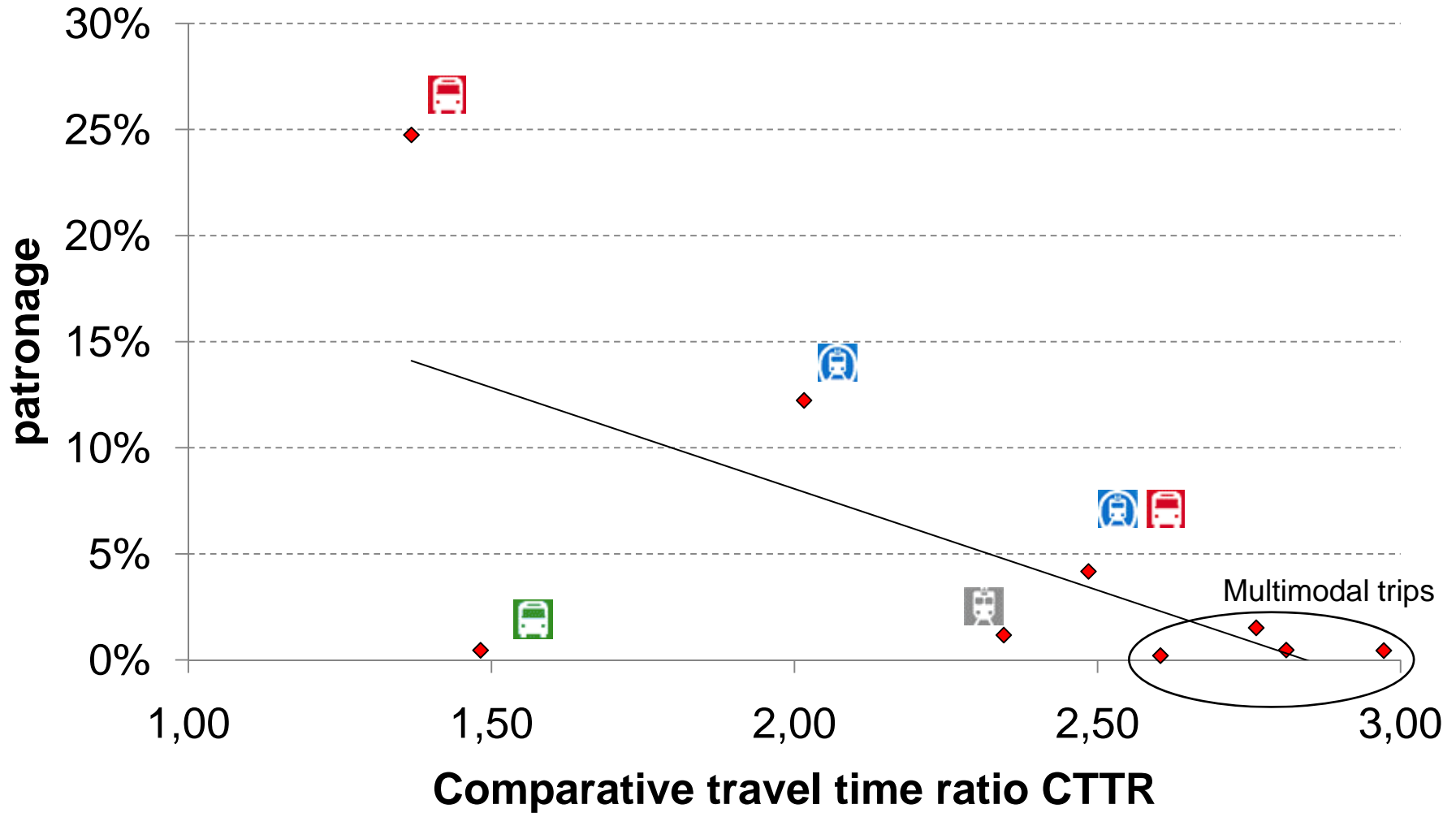
4) Trips inside CBD (O/D 1)



4) Trips between CBD and Periphery (O/D 2)



4) Trips inside Periphery (O/D 3)

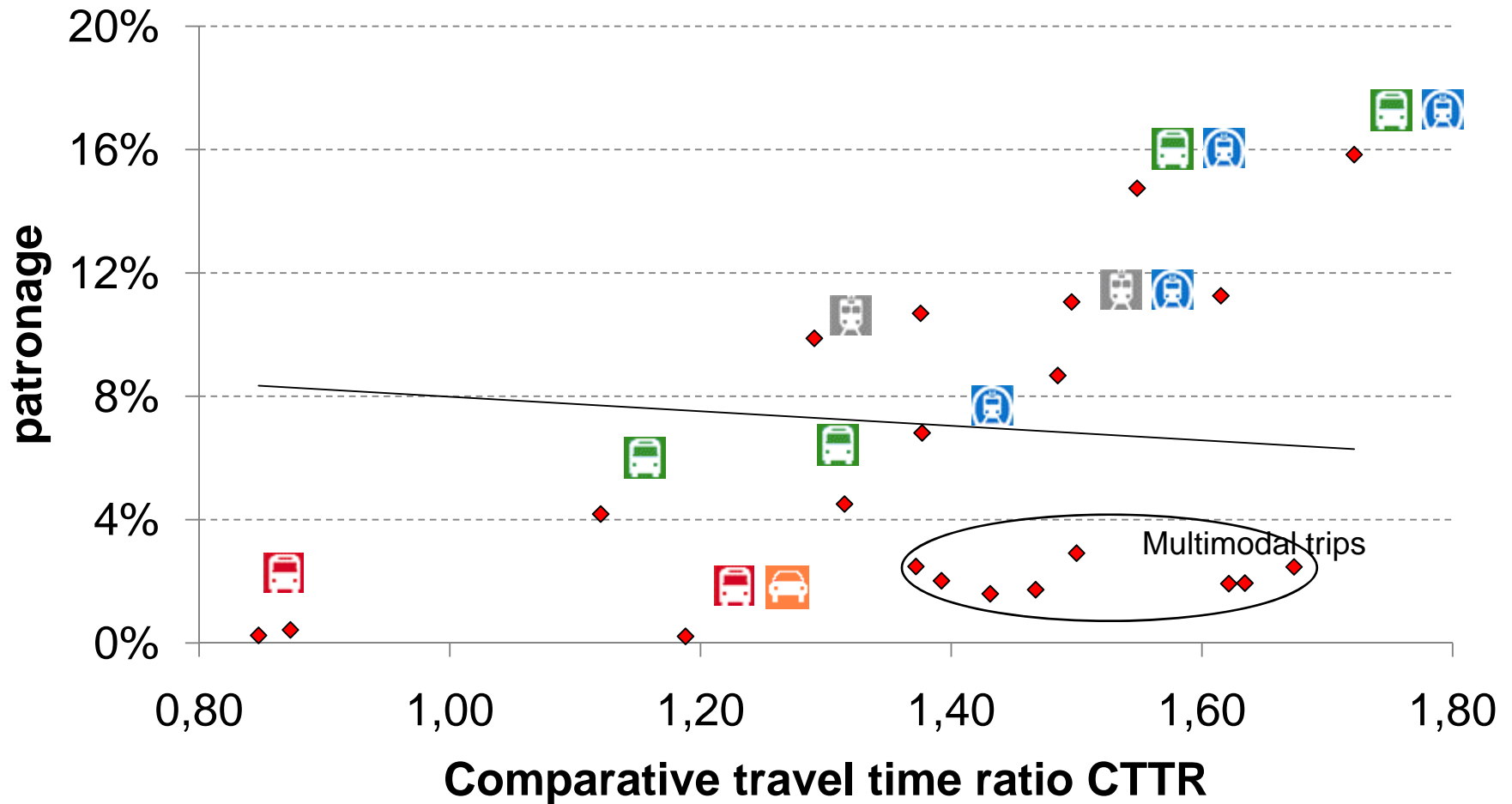


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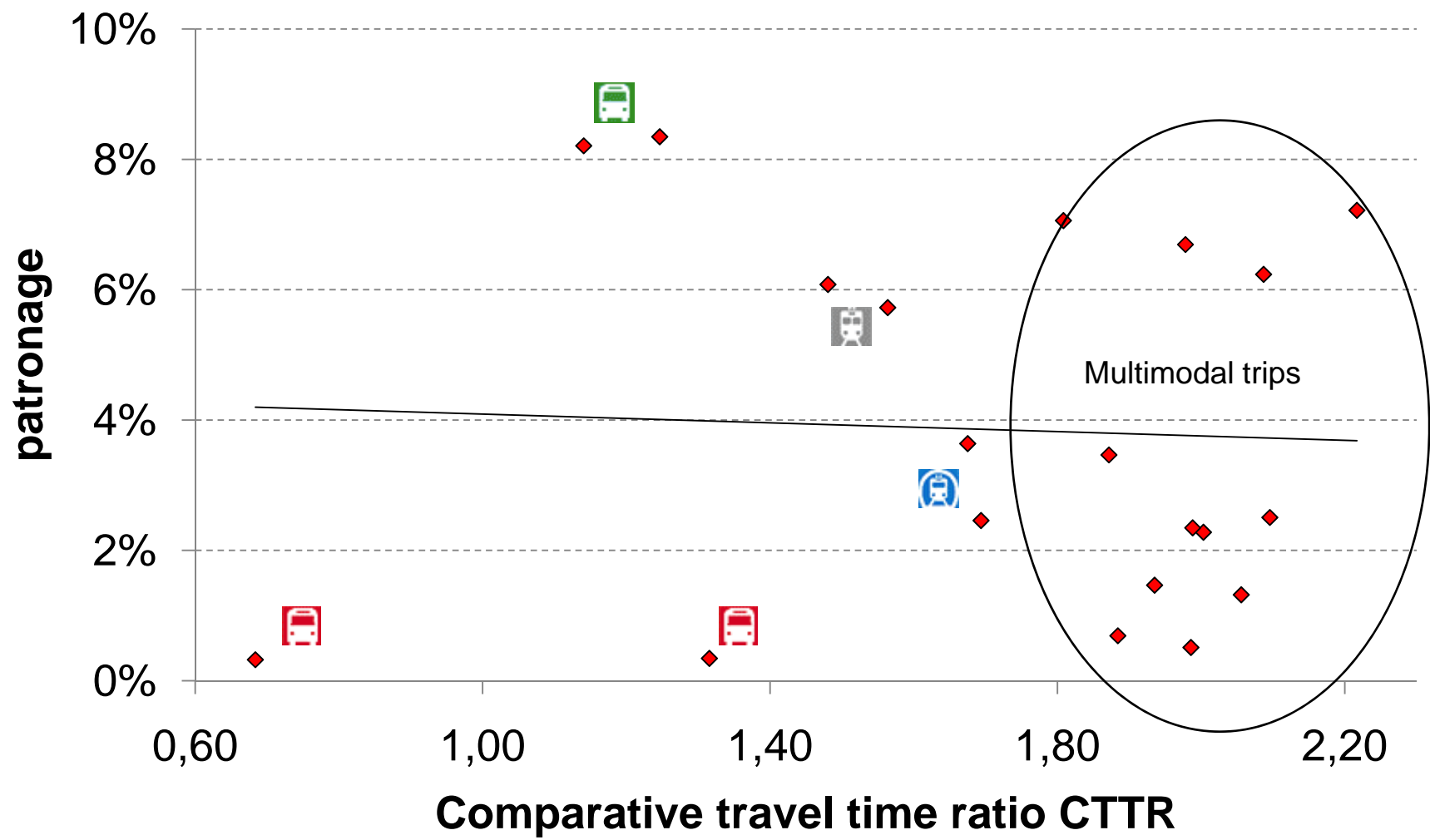
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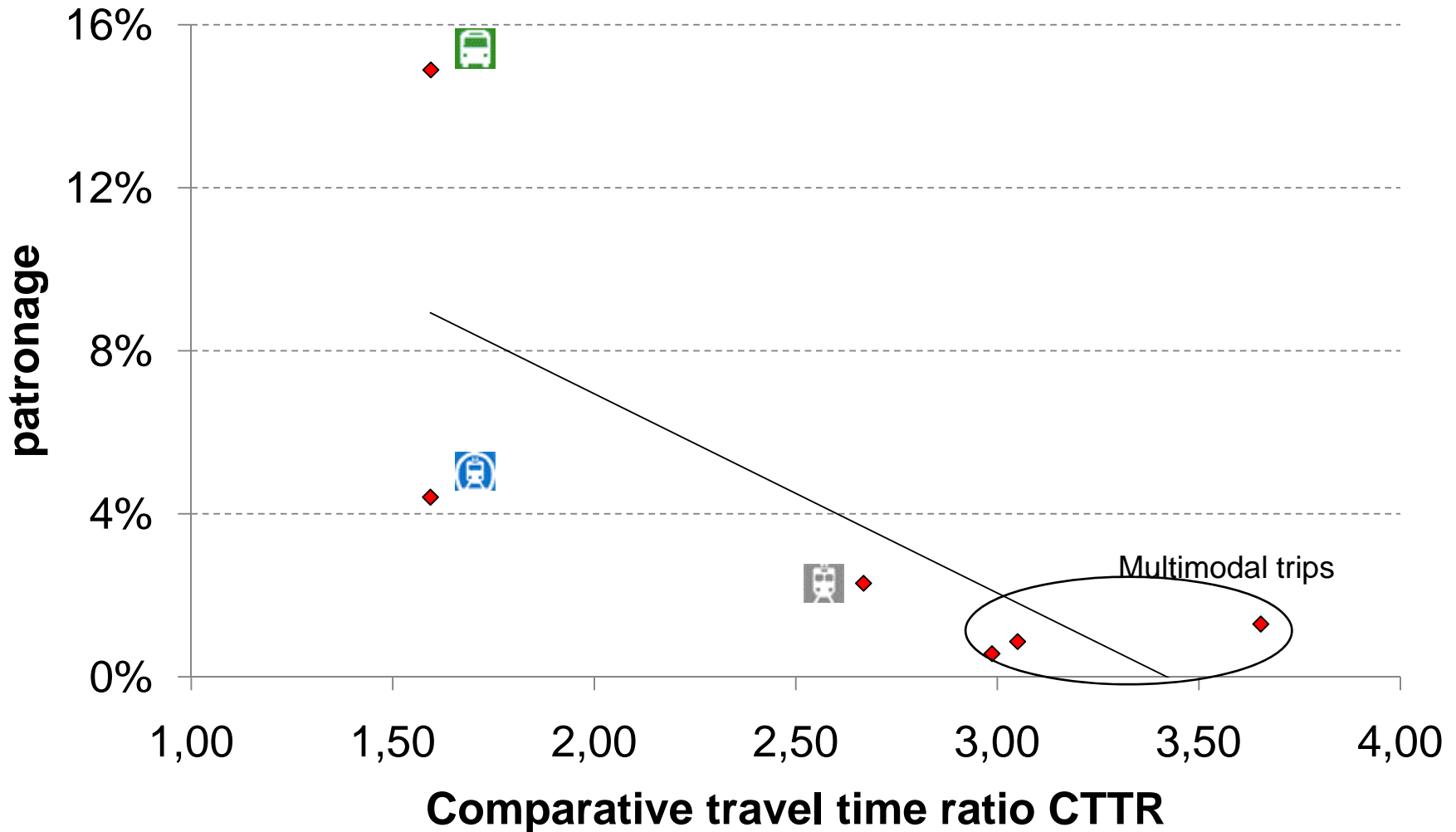
4) Trips between CBD and Metropolitan ring (O/D 4)



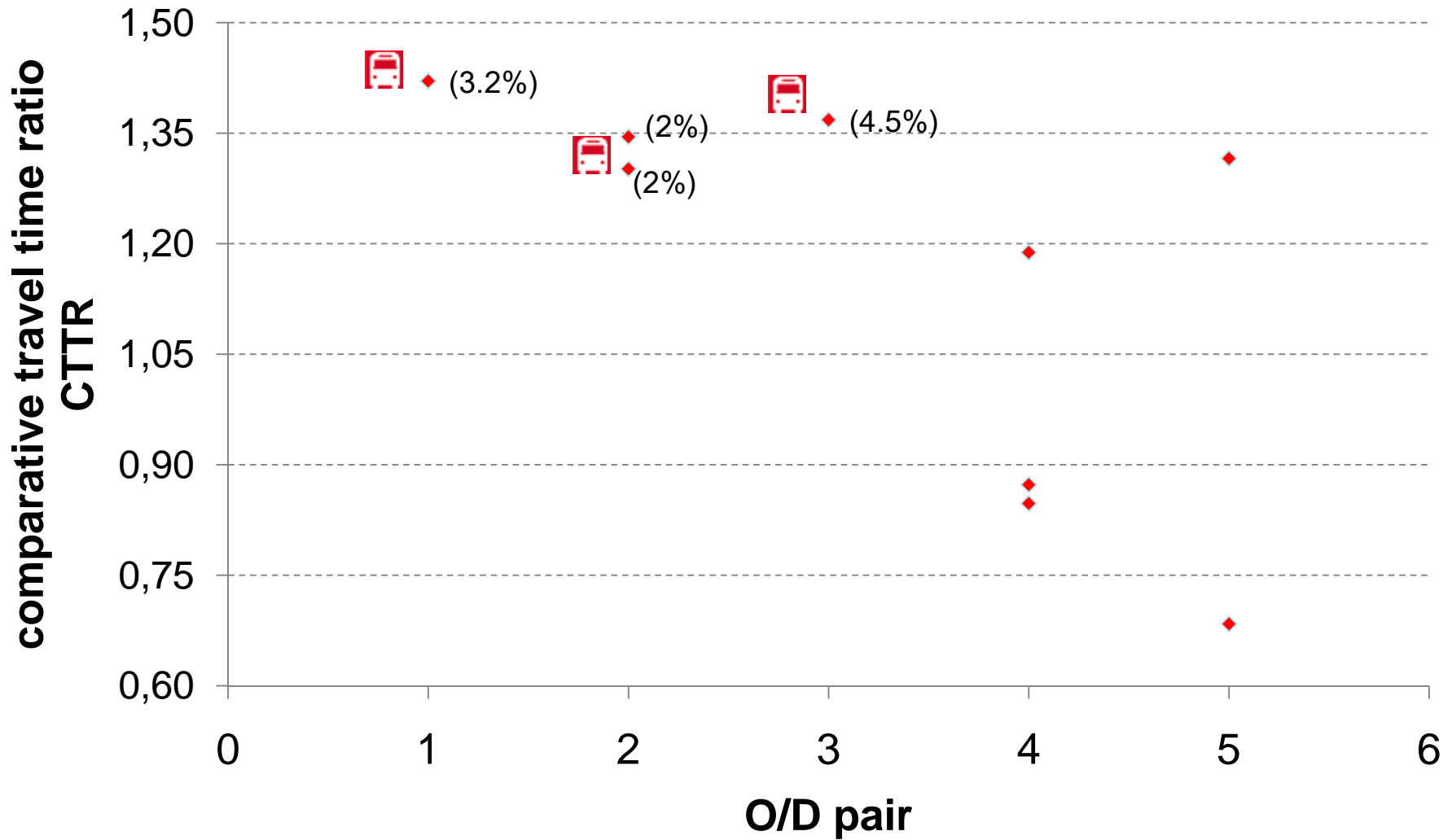
4) Trips between Periphery and Metropolitan ring (O/D 5)



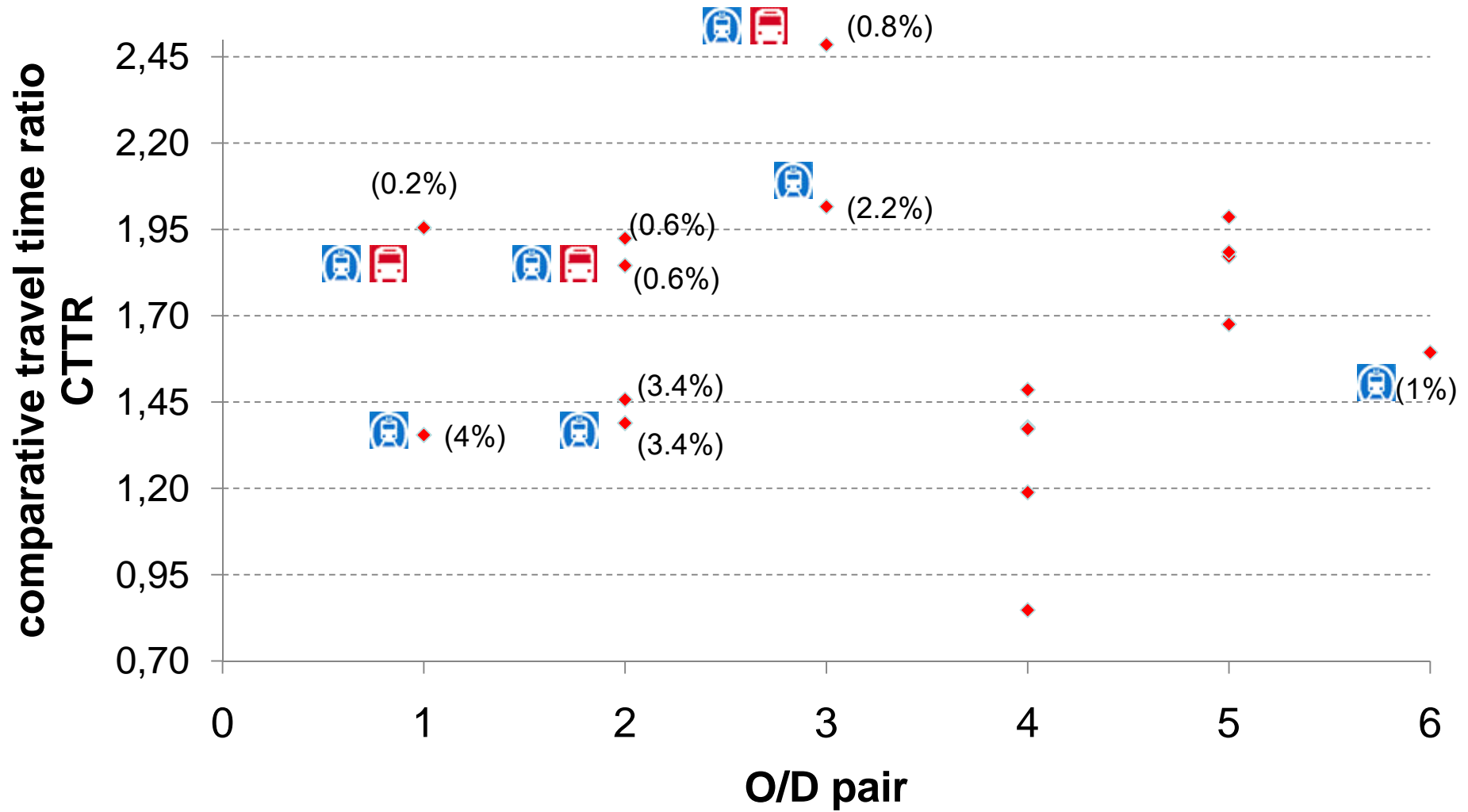
4) Trips inside Metropolitan ring (O/D 6)



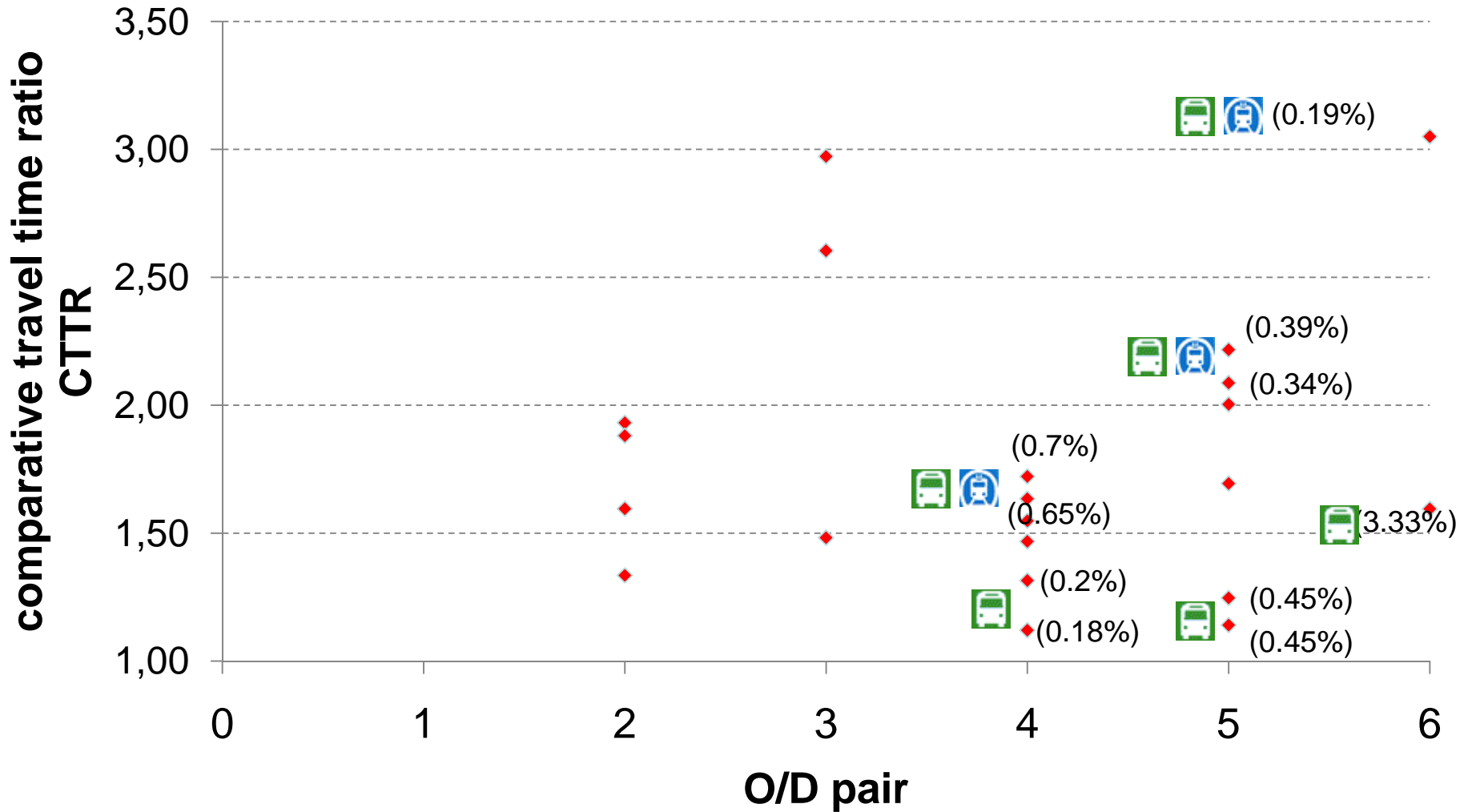
4) Urban bus of Madrid Trips



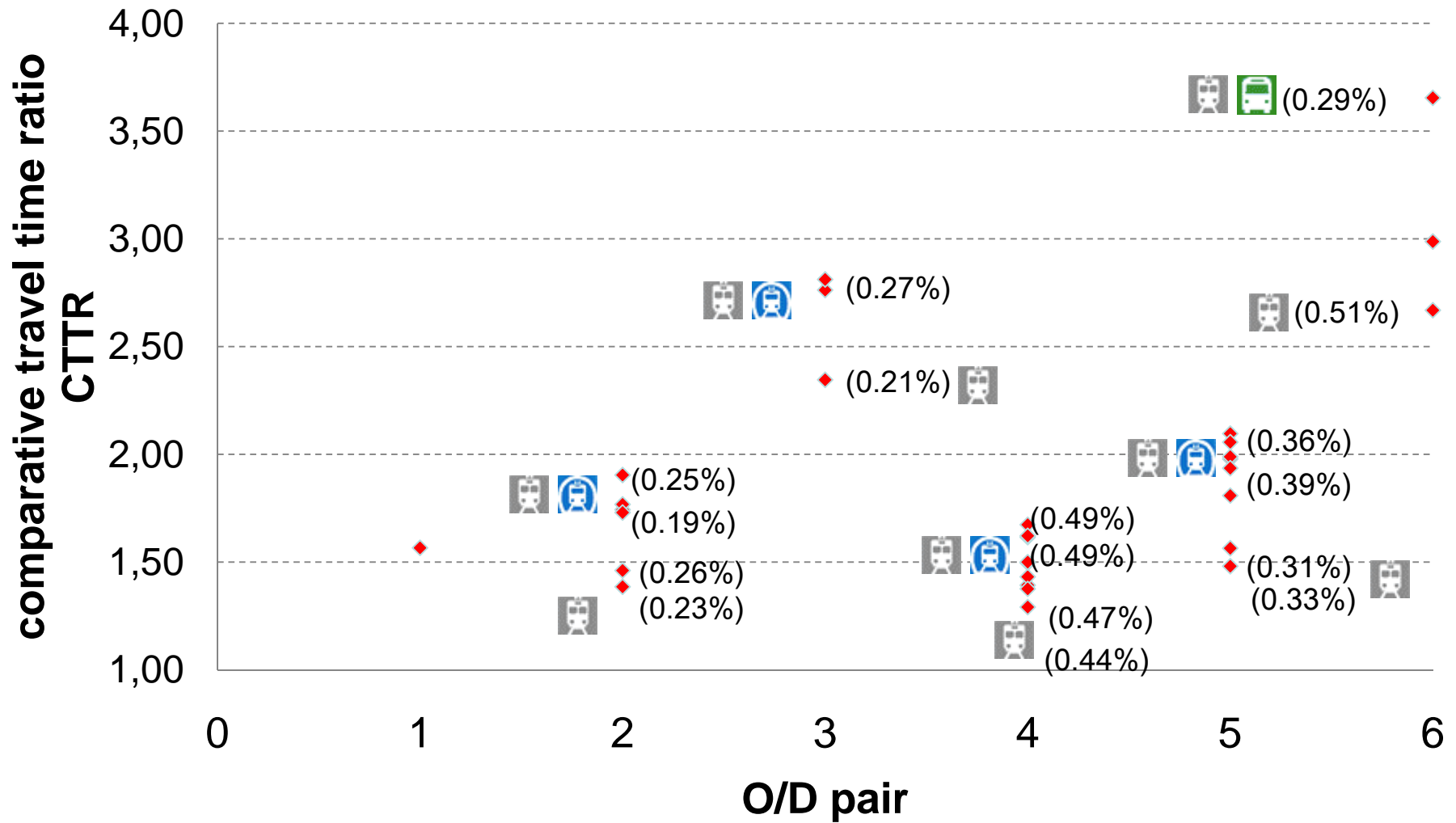
4) Metro trips



4) Suburban bus Trips



4) Suburban rail Trips



5) Conclusions (I)

- **Monomodal** public transport trips:
 - CTTR values ≤ 1.5 +
 - Patronage is significant +
- **Multimodal** public transport trips:
 - CTTR values high, even >3 ✘
 - Patronage is not significant ✘

5) Conclusions (& II)

- Trend of CTTR for different modes:
Decreases as long as we are closer to the CBD and public transport patronage is getting higher +
 - Urban buses trips
 - Metro trips
 - Suburban buses + Metro tripsIn other cases, it is not clear
- If CTTR **1.5 – 2** , public transport is competitive against car

Thank you for your attention

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